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Mesozooplankton distribution in the Spermonde Archipelago (Indonesia, Sulawesi) with special reference to the Calanoida (Copepoda)

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ABSTRACT

In September 2005 the mesozooplankton distribution, taxonomic composition and community structure were studied on four cross-shelf and one coastal transects in the Spermonde Archipelago off Makassar (SW Sulawesi). A total of 47 higher taxonomic groups and 89 calanoid copepod species were identified. Copepods outnumbered the other mesozooplankton taxa with 29 to 69%, increasing in importance towards the offshore stations. Appendicularians ranked second (16–24%) followed at the offshore stations by chaetognaths (4.5%) and, at shelf and coastal stations by echinoderm pluteus larvae (11–15%). Within the calanoids, species of the family Paracalanidae, especially *Paracalanus* cf. *parvus*, were dominant at all stations. Other abundant families were Temoridae (6.5–17%), Acartiidae (7.2%) and Pontellidae (6.2%) at shelf and coastal stations while Clausocalanidae (8.7%) and Calanidae (6.7) were more abundant at offshore stations.

To investigate the mesozooplankton distribution the 25 stations were grouped into 3 geographical zones based on their topographical and hydrographical differences (coastal, shelf and offshore zone). Some higher zooplankton taxa and about half of the calanoid species occurred only in one or two categories. In general the abundant taxa were spread throughout the Archipelago. To investigate their distribution the abundance data were subjected to a multivariate discriminant function analysis (MDFA). The results revealed that the composition of the mesozooplankton community changed from the coastal zone with a high abundance of meroplankton and neritic copepod species to an offshore community with a higher abundance of holoplanktonic organisms and oceanic copepod species.

1. Introduction

The Spermonde Archipelago is a tropical shelf system off southwestern Sulawesi. Shelf seas mark the transition between the terrestrial (i.e. riverine) and oceanic realm. Their living communities are, hence, influenced by distance from shore, shelf depth and exposure to oceanic currents (Cleary et al., 2005), offering the opportunity to study the gradual changes in the distribution of pelagic and benthic organisms from estuaries to the open sea. In contrast to temperate latitudes, only little is known from tropical shelf seas.

The Spermonde Archipelago represents a barrier reef system of about 4000 km^2 coverage and a maximum extension of 60 km (Pet-Soede et al., 1999). The shelf gradually declines towards offshore, reaching a maximum depth of 60 m. A discontinuous barrier reef with several islands and shoals divides the shelf from the deep Makassar Strait, a major throughflow of subtropical Pacific Ocean water. Aside from the barrier reef along the outer rim, the archipelago accommodates cay- crowned and submerged patch reefs (Hoeksema, 1990). The main freshwater input derives from the river Jene Berang south of Makassar. The Jene Berang also contains terrigenous sediments originating from a volcanic drainage area as well as nutrient loads and sewage water from Makassar, a city with more than one million inhabitants. During the dry season fluvial discharge has been reported to be restricted to an area of 4 km parallel to the coastline (Cleary et al., 2005). Other major rivers such as Tallo and Sangkarak are of less influence concerning input of sediments, nutrients and pollution products (Cleary et al., 2005). In spite of a number of benthic studies in the Spermonde Archipelago (e.g. Hoeksema, 1990; Renema and Troelstra, 2001; Cleary et al., 2005; Becking et al., 2006), information on the pelagic community is lacking.

The zooplankton composition of tropical shelf regions is characterized by a persistent gradient from in- to offshore (Sammarco and Crenshaw, 1984; Williams et al., 1988; McKinnon and Thorrold, 1993). Generally, the inshore plankton is characterized

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